B. Sc.- Semester II

OPTICS

(4 CREDITS)   **PAPER I**   **(40 LECTURES)**

Unit I

Interference of two beams of light, Conditions for interference, Spatial and temporal coherence, classification of interference, Division of Wavefront: Fresnel's Biprism, Lloyd's Mirror. Division of amplitude: Newton's rings, Michelson's Interferometer, Fringes of equal inclination, Fringes of equal thickness, Interference involving multiple reflections, Stokes' treatment, interference in transmitted light, Fabry-Perot interferometer, Edser- Butler interferometer.

Unit II

Fresnel and Fraunhofer Diffraction, Diffraction by a single and double slits. Derivation of equation for intensity, comparison of single-slit and double slit patterns, distinction between interference and diffraction, missing orders. Diffraction grating, formation of spectra by a grating, principal maxima, difference between spectra of prism and grating, production of ruled grating.

Unit III

Rayleigh's criterion of resolution, Resolving power of Grating, Resolving power of a telescope, Fresnel's half period zones, the straight edge, diffraction at a narrow wire, Zone plate. Polarization, polarization by reflection, polarizing angle, Brewster's law, Law of Malus, Polarization by dichroic crystals, birefringence, anisotropic crystals, Nicol prism, Retardation plates, Babinet compensator, Analysis of polarized light.

Unit IV

Optical activity and Fresnel's explanation, Half shade and Biquartz polarimeters, Jones matrix, matrix representation of plane polarized waves, matrices for polarizers, retardation plates and rotators; Sources of light: Incoherent (Sodium, Neon,Mercury) and coherent (Laser-simple treatment).

B. Sc.- Semester II

PRACTICALS

(4 CREDITS)   **PAPER II**

1. Modulus of rigidity by statical method.
2. Young's modulus of material of a beam by flexure method.
3. Wavelength of sodium light by Newton's rings.
4. Surface Tension of water by capillary rise method.
5. Resolving power of a Telescope.
6. Specific rotation of an optically active substance by Polarimeter.
7. Diameter of a wire by diffraction.
8. Dispersive power of a prism.
9. Verification of Brewster's law.
10. Frequency of A.C. mains using a Sonometer.
11. 'g' by Compound Pendulum.